

516-CD-002-002

**EOSDIS Core System Project**

**Release B Reliability Predictions  
for the ECS Project**

March 1996

Hughes Information Technology Systems  
Upper Marlboro, Maryland

# **Release B Reliability Predictions for the ECS Project**

**March 1996**

Prepared Under Contract NAS5-60000  
CDRL Item #089

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3/22/96

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## Preface

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This document is a contract deliverable with an approval code 2. As such, it does not require formal Government approval, however, the Government reserves the right to request changes within 45 days of the initial submittal. Once approved, contractor changes to this document are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by Document Change Notice (DCN) or by complete revision.

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## Abstract

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This Reliability Predictions report (CDRL #89, DID #516) presents Commercial-Off-The-Shelf (COTS) vendors predicted and actual field mean-time-between-failures (MTBFs) of all the ECS hardware configuration items (HWCIs) which are presented at the Release B Critical Design Review (CDR). These MTBFs are required to support the availability modeling task the results of which are documented in CDRL #88, DID #515.

**Keywords:** reliability, prediction, MTBF, failure rate, availability, COTS data, GFE, MIL-HDBK-217F, NRPD, relex

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5-1 and 5-2	Submitted as Final		
A-1 through A-20	Submitted as Final		
AB-1 and AB-2	Submitted as Final		
<b>Document History</b>			
<b>Document Number</b>	<b>Status/Issue</b>	<b>Publication Date</b>	<b>CCR Number</b>
516-CD-001-001	Review Copy	February 1995	
516-CD-001-002	Preliminary Copy	March 1995	
516-CD-001-003	Final Copy	July 1995	95-0502
516-CD-002-001	Submitted as Final	October 1995	95-0774
516-CD-002-002	Submitted as Final	April 1996	96-0147

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# **1. Introduction**

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## **1.1 Identification of Document**

This Reliability Predictions Report, Contract Data Requirements List (CDRL) Item 089, whose requirements are specified in Data Item Description (DID) 516/PA2, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

## **1.2 Scope of Document**

This report incorporates Government's comments received by the Data Management Office (DMO) on December 6, 1995 in the technical report No. 995-TR-951-175. This report also provides updates to the Release B Incremental Design Review (IDR) submittal which was generated at the ECS Release B IDR time frame. The purpose of this submittal is to reflect the current ECS architecture and to present detailed predicted and operational MTBFs of the proposed ECS hardware configuration items (HWCI's) presented at the Release B Critical Design Review (CDR) time frame. These HWCI's MTBFs are provided by the commercial-off-the shelf (COTS) vendors and are thoroughly reviewed for accuracy by the ECS reliability and hardware procurement organizations. The applicable Distributed Active Archive Center (DAAC) sites for the Release B SDPS and CSMS are: Goddard Space Flight Center (GSFC), Earth Resources Observation System (EROS) Data Center (EDC), Langley Research Center (LaRC), Jet Propulsion Laboratory (JPL), National Snow and Ice Data Center (NSIDC), Oak Ridge National Laboratory (ORNL), and Alaska Synthetic Aperture Radar (SAR) Facility (ASF).

The report also presents the Parts Count reliability prediction methodology, ground rules and assumptions in accordance with MIL-Handbook-217F and Non Electronic Parts Reliability Data (NPRD-91) which are required when specific COTS vendor data or comparable vendor data are not available. The reliability software tool named Relex that supports the parts count prediction is also described in this report.

This document reflects the February 14, 1996 Technical Baseline maintained by the ECS Configuration Control Board in accordance with the ECS Technical Direction No.11 dated December 6, 1994.

## **1.3 Purpose and Objectives of Document**

This Reliability Predictions report provides the ECS predicted hardware reliability data to support the availability modeling activity which was documented in DID #515/PA2, Availability Models/Predictions, and to support the maintainability predictions activity which was documented in DID #518/PA3, Maintainability Predictions. The Reliability prediction is a continuous and iterative process throughout the program life cycle to ensure that the ECS system will achieve its functional availability requirements. This task is performed early in the design

process or once hardware is identified, in order to be an effective aid in evaluating the ECS design by providing information that can be used as the basis for design decisions such as redundancy and fault management design approach. High failure rate items are also identified so that special consideration can be given to areas that constitute potential risks to the system.

Results from this report will be used as inputs for determining life cycle costs, sparing requirements, maintenance planning, and the development of the Maintainability Predictions and Availability Models reports.

## **1.4 Document Status and Schedule**

This submittal of DID 516/PA2 meets the milestone specified in the Contract Data Requirements List (CDRL) of NASA Contract NAS5-60000. It is anticipated that this submittal will be reviewed during the Release B Critical Design Review (CDR), and that subsequent changes to the document will be incorporated into a resubmittal to be delivered two weeks after receiving comments from the customer.

Subsequent reliability prediction updates for each release configuration will be submitted at each release Incremental Design Review (IDR), CDR, and throughout the ECS life cycle.

## **1.5 Document Organization**

The document is organized into five (5) sections and one Appendix:

- Section 1      Introduction, contains the identification, scope, purpose and objectives, status and schedule, and document organization.
- Section 2      Related Documentation, provides a bibliography of parent, applicable and information documents for the Reliability Predictions.
- Section 3      ECS Reliability Predictions Methodology, describes the reliability requirements, assumptions and ground rules, and prediction techniques.
- Section 4      Other Failure Rate Data Sources, identifies vendor, GFE, and non-electronic parts data sources.
- Section 5      Reliability Prediction Data, describes the reliability data for the FOS, SDPS, and CSMS.
- Appendix A      Reliability Data, provides detailed spreadsheets divided into two sections; one for FOS and one for SDPS and CSMS hardware configuration items.

## **2. Related Documentation**

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### **2.1 Parent Documents**

The parent document is the document from which this Reliability Predictions document scope and content are derived.

194-207-SE1-001	Systems Design Specification for the ECS Project
420-05-03	Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)
423-41-01	Goddard Space Flight Center, EOSDIS Core System Statement of Work
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System
423-41-03	Goddard Space Flight Center, EOSDIS Core System Contract Data Requirement Document

### **2.2 Applicable Documents**

The following documents are referenced within this Reliability Predictions document, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume.

194-501-PA1-002	Performance Assurance Implementation Plan (PAIP) for the ECS Project
194-502-PA1-001	Contractor's Practices & Procedures Referenced in the PAIP for the ECS Project
210-TP-001-006	Technical Baseline for the ECS Project
515-CD-002-002	Availability Models/Predictions for the ECS Project
518-CD-002-002	Maintainability Predictions for the ECS Project
MIL-HDBK-217F	Department of Defense Military Handbook: Reliability Prediction of Electronic Equipment
NPRD-91	Reliability Analysis Center/Rome Laboratory/Griffiss AFB; Nonelectronic Parts Reliability Data

## **2.3 Information Documents**

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These documents are not binding on the content of the Reliability Predictions document.

MIL-STD-785	Department of Defense Military Standard: Reliability Program For Systems and Equipment Development and Production, Task 203
none	Innovative Software Designs, Inc.; Relex for Windows Version 5.1 Reference Guide, copyright 1987-1994

### **3. ECS Reliability Predictions Methodology**

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#### **3.1 Reliability Prediction Requirements**

The ECS design uses state-of-the-art COTS hardware to meet requirements and take advantage of the rapidly changing technology; therefore, the primary source for failure rates is COTS vendor supplied data.

Reliability Predictions are required to support the Availability Modeling/Prediction activity (DID 515/PA2). The reliability data supporting the reliability predictions is obtained or developed in the following order of priority in accordance with the ECS performance requirements of Paragraph 5.3.3 in document 420-05-03:

- 1) COTS vendor supplied reliability data will be utilized at the purchased hardware unit level. If this data is unavailable;
- 2) Historical or comparable data for like hardware items using similar technologies in similar environments will be utilized. If this data is unavailable;
- 3) A Parts Count Reliability Prediction will be performed on the hardware per MIL-HDBK-217F, Appendix A. This parts count prediction will use engineering parts lists (EPLs) and/or schematic diagrams provided by the COTS vendors. Predictions for non-electronic parts will be made using NRPD-91, Nonelectronic Parts Reliability Data 1991, which supersedes NRPD-3.

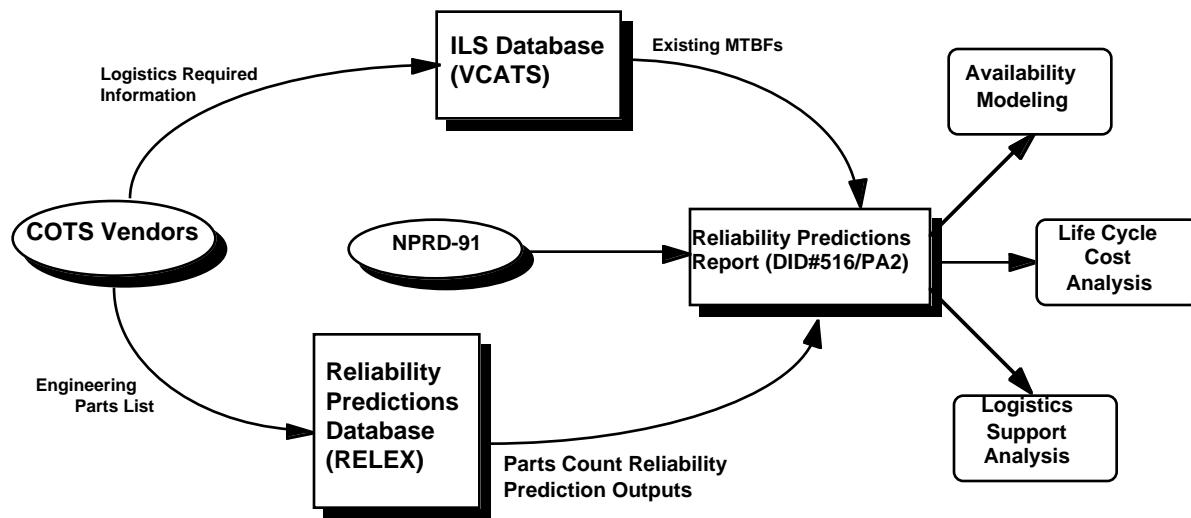
#### **3.2 COTS Vendor Data**

All COTS vendors are required to provide reliability values down to the line-replaceable-unit (LRU) level with their identified source. Reliability data sources can be either of the following:

- a. Field service data,
- b. Test data,
- c. Predicted data.

Vendor reliability data are collected by the ECS M&O (Maintenance and Operations) group as part of the procurement process. ECS Systems Reliability engineers will participate in this process to ensure the validation and integrity of the reliability data. This process is detailed in document 194-502-PA1-001, Contractor's Practices & Procedures Referenced in the PAIP for the ECS Project, project instruction (PI) RM-1-002, Control of COTS Subcontractors and Suppliers. Figure 3.2-1 presents the COTS vendor reliability data flow process for the ECS program. This data are recorded in the Integrated Logistic System (ILS) data base called the Vendor Costing And Tracking System (VCATS). The Systems Engineering group then receives a report identifying the hardware description, vendor, and reliability data. This data are then used as the basis for the reliability predictions (MTBF values) for each segment and is shown in Appendix A.1 for FOS, and Appendix A.2 for SDPS and CSMS with detailed explanations in Section 5.0.

If vendor data on specific COTS products is not available, historical or comparable data for like hardware using similar technology in similar environments are utilized if available and acceptable. In the case where vendor reliability data is unavailable, COTS vendor Engineering Parts Lists (EPLs) are requested from the vendor and input into the reliability prediction software called Relex. Relex will then generate the piece parts reliability prediction output which will become part of the Reliability Predictions Report.



**Figure 3.2-1. COTS Vendor Reliability Data Flow Process**

### 3.3 Parts Count Technique of MIL-HDBK-217F

If vendor reliability data is unavailable and no historical or comparable data for like items using similar technology are available, a reliability calculation will be made using the methodology defined in Appendix A: Parts Count Reliability Prediction, of MIL-HDBK-217F. The general mathematical expression for equipment failure rate using this method is:

$$\lambda_{EQUIP} = \sum_{i=1}^{i=n} N_i (\lambda_g \pi_Q)_i$$

for a given equipment environment where:

$\lambda_{EQUIP}$  = Total equipment failure rate (failures /  $10^6$  hrs)

$\lambda_g$  = Generic failure rate for the  $i^{th}$  generic part (failures /  $10^6$  hrs)

$\pi_Q$  = Quality factor for the  $i^{th}$  generic part

$N_i$  = Quantity of  $i^{th}$  generic part

$n$  = Number of different generic part categories in the equipment

The prediction data will account for the generic part types, piece part quantities, part quality levels, and equipment environment when calculating the part's generic failure rate.

### 3.4 Assumptions and Ground Rules

The following are assumptions and ground rules for the ECS reliability predictions in accordance with MIL-HDBK-217F Parts Count methodology:

- 1) The operating environment is Ground Benign (GB). This environment pertains to scientific computer complexes which are non mobile, have temperature and humidity controlled environments, and are readily accessible for maintenance.
- 2) The average parts junction temperature  $T_j$  is 50°C.

If there is insufficient information to define a part's parameters, then:

- 3) The quality factor ( $\pi_Q$ ) for discrete semiconductors, resistors, and capacitors will be "Lower".
- 4) The quality factor for electro-mechanical parts in Table A-11 of MIL-HDBK-217F will be "Non-MIL".

### 3.5 Reliability Predictions Software Tool - Relex

Reliability and Maintainability predictions data are maintained in VCATS. If reliability data is unavailable from the COTS vendors and no comparable and similar hardware reliability data are available, a request for Engineering Parts Lists (EPLs) is sent to the vendor. When EPLs are received, the components are entered into the VCATS and Relex reliability prediction software. Relex is MIL-HDBK-217F compliant and is produced by Innovative Software Designs, Inc. The software produces the predicted MTBF of an assembly by utilizing built-in libraries to look up each individual component's failure rate parameters. The predicted reliability data is then entered into the worksheet's MTBF column in Appendix A for the appropriate assembly/item and

segment. A sample output report from this automated reliability prediction software tool is shown in Figure 3.5-1.

Relex 217F Notice 1		Standard Report			Page: 1
Part Number	:9124561-00	Description	:Sample System Tree		
Reference Des:	S1	File Name	:SAMPLE.TRE		
Date	:January 10, 1995	Time	:08:07 a.m.		
Environment	:Ground Benign	Failure Rate	:0.111047		
Temperature	:30.0	MTBF	:9.005170e+06		
Item	Part Number	Reference Designator	Quantity	Failure Rate	MTBF
BOX	7800901-1	B1	1	0.082978	1.205140e+07
BOARD1.SUB	123X456	A1	1	0.055386	1.805510e+07
BOARD2.SUB	234X567	A2	1	0.027592	3.624260e+07
BOARD3.SUB	345X678	A3	1	0.028070	3.562570e+07

**Figure 3.5-1. Sample Relex Output Report (1 of 2)**

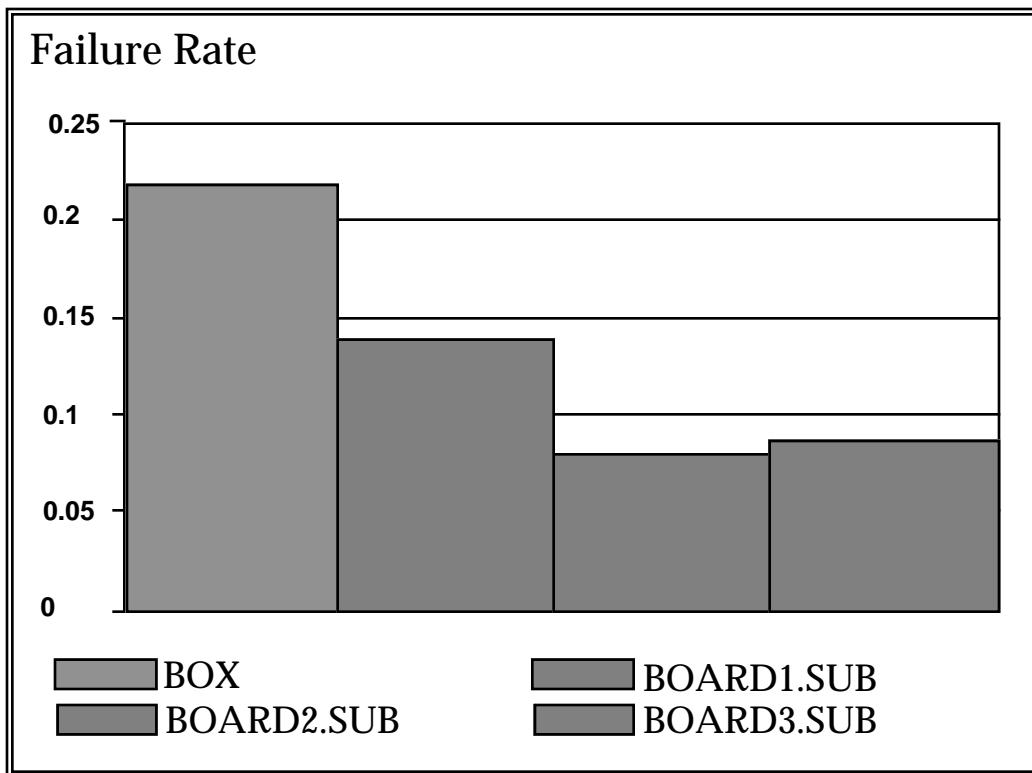
Relex 217F Notice 1		Standard Report			Page: 2
Part Number	:123X456	Description	:Sample Relex Subassembly		
Reference Des:	A1	File Name	:BOARD1.SUB		
Date	:January 10, 1995	Time	:08:07 a.m.		
Environment	:Ground Benign	Failure Rate	:0.055386		
Temperature	:30.0	MTBF	:1.805510e+07		
Record Number	Part Number	Part Category	Ref. Des.	Failure Rate, Unit	Qty Failure Rate
1	74LS00	Integrated Circuit	U1	0.005549	1 0.005549
2	74LS04	Integrated Circuit	U2-U3	0.005562	2 0.011124
3	74HC374	Integrated Circuit	U4	0.009621	1 0.009621
4	2147	Integrated Circuit	U5	0.029092	1 0.029092

**Figure 3.5-1. Sample Relex Output Report (2 of 2)**

In addition to the prediction computation and report generation, Relex is also used to graphically identify high failure rate LRUs, perform trade studies; varying hardware configurations, temperature, environment, part quality levels, and part stress levels.

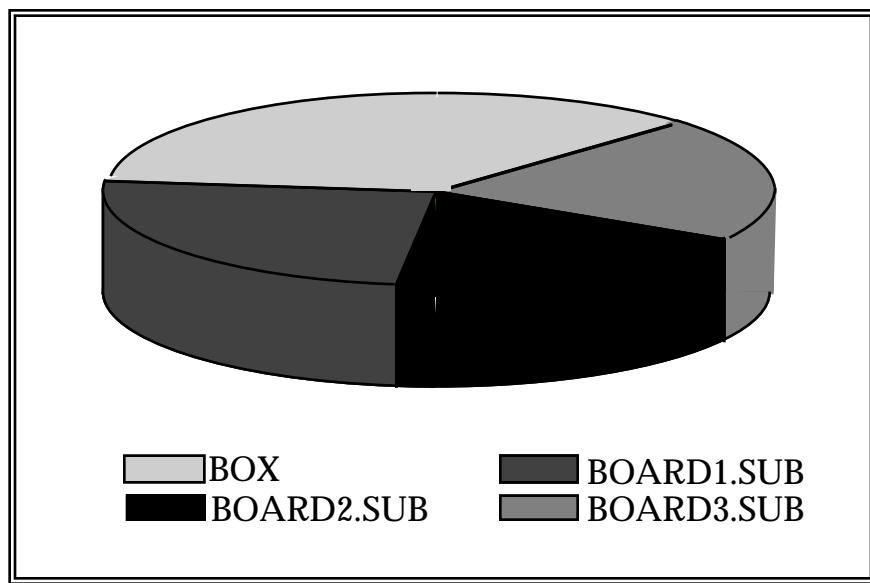
The following figures graphically show some of these additional capabilities of the Relex reliability prediction software tool.

Figure 3.5-2 graphically compares sample hardware failure rates to help highlight high failure rate LRUs.



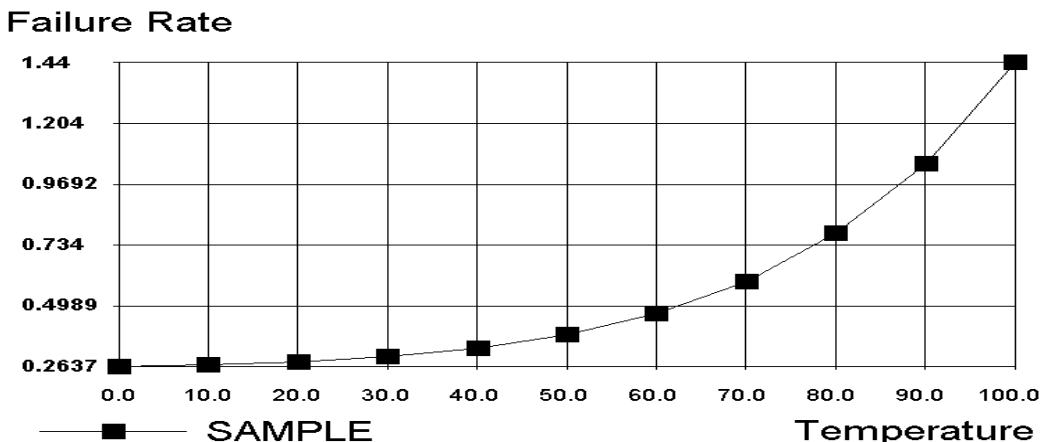
**Figure 3.5-2. Sample Relex Bar Chart Comparison of Hardware Failure Rates**

Figure 3.5-3 shows the same data as Figure 3.5-2 but displays the sample hardware failure rates in a pie chart format for a graphical comparison.



**Figure 3.5-3. Sample Relex Pie Chart Comparison of Hardware Failure Rates**

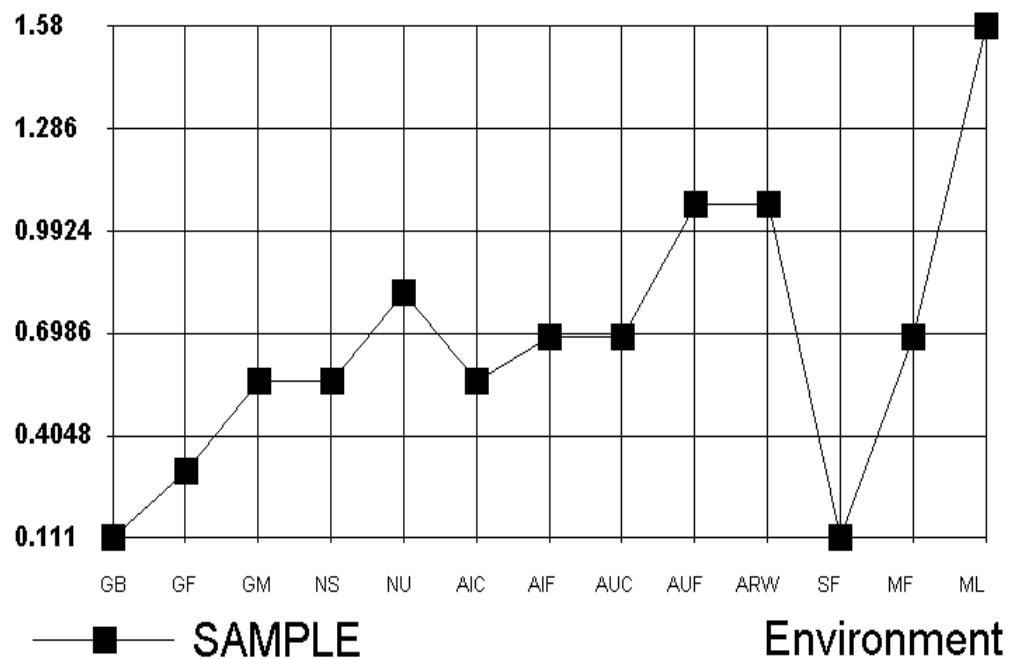
Figure 3.5-4 below displays a sample of a system's failure rate sensitivity to operating temperature.



**Figure 3.5-4. Sample Relex Graph of Failure Rate vs Temperature**

Figure 3.5-5 below shows a line graph of a sample system's failure rate versus the system's operating environment ( $\pi_E$ ) as defined in MIL-HDBK-217F.

## Failure Rate



**Figure 3.5-5. Sample Relex Graph of Failure Rate vs Operating Environment**

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## **4. Other Failure Rate Data Sources**

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### **4.1 Government Furnished Equipment (GFE) Provided Data**

Since all required RMA functional hardware strings within the DAACs consist of COTS equipment, a GFE provided data list is not required for these functions.

For the inter-DAAC required function (EOSD3990: SDPS Function of Data Order Submission Across DAACs), a GFE list will be requested and incorporated by the EBNet provider. ECS Reliability Engineering group will ensure that quantitative RMA requirements are appropriately specified for the network by the EBNet provider so that the overall functional requirement can be achieved.

### **4.2 Nonelectronic Parts Reliability Data 91 (NPRD-91)**

Nonelectronic Parts Reliability Data 91 is used to complement the MIL-HDBK-217 parts count prediction by providing failure rate data on various electrical, electromechanical, and mechanical parts and assemblies which are not modeled in MIL-HDBK-217. NPRD-91 provides historical reliability data (failure rates) to aid engineers in estimating the reliability of systems.

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## 5. Reliability Prediction Data

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The reliability data presented in Appendix A is divided into two sections. The first section A.1 contains FOS reliability data and the second section A.2 contains SDPS and CSMS reliability data.

The definition for each worksheet column follows:

<u>Column Title</u>	<u>Description</u>
Site	Physical location of hardware
HWCI	Hardware Configuration Item within the Segments
Rel	Release in which hardware is present
Qty	Number of items used in this subsystem
Item Description	Hardware name and/or description
Model	Manufacturer model number of hardware
MTBF	Mean Time Between Failure
Data Source	Source of MTBF data. (i.e. Vendor, Parts Count Prediction, Nprd, Similar to)

### 5.1 Flight Operations Segment (FOS) Reliability Data

Appendix A.1 presents the detailed listings of the FOS hardware for Release B at GSFC with their associated MTBFs. These MTBFs are predicted and/or field return reliability data which were provided by the COTS vendors. The hardware models in Appendix A.1 are selected hardware candidates for Release B which were presented at the FOS CDR time frame. The data in Appendix A.1 remains unchanged from the previous submittal.

### 5.2 Science Data Processing Segment (SDPS) and Communications and System Management Secgemnt (CSMS) Reliability Data

Appendix A.2 presents the detailed listings of the SDPS and CSMS hardware for Release B at GSFC, LaRC, EDC, NSIDC, JPL, ORNL, and ASF DAAC sites with their associated MTBFs. These MTBFs are predicted and/or field return reliability data which were provided by the COTS vendors. The hardware models in Appendix A.2 are selected SDPS and CSMS hardware candidates for Release B which will be presented at the Release B CDR time frame. As the SDPS design evolves, any changes to the hardware list will be updated with latest vendor's MTBF data.

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# Appendix A. Reliability Data

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## A.1 Flight Operations Segment (FOS) Reliability Prediction Data

***FOS COTS Hardware RMA Data For Release B***

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
GSFC	EOC-SRV	B	3	Real Time Server: 256MB,2GB,CDROM, 4mm DAT, Dual FDDI Card	DEC Alpha 1000 4/233	14,327	Vendor 217 Pred.
GSFC	EOC-SRV	B	3	Data Server:256MB,2GB,CDROM, 4mm DAT, Dual FDDI Card	DEC Alpha 1000 4/233	14,327	Vendor 217 Pred.
GSFC	EOC-WS	B	36	FOT WorkStation: 64MB,2GB, CD ROM, 2 Ethernet Cards, 21" monitor	SUN Sparc20 Model 71	8,612	Vendor 217 Pred.
GSFC	EOC-T-SRV	B	2	Time System and Rack	TYMESEERV2000 IRIG	70,000	Vendor 217 Pred.
GSFC	EOC-RAID	B	2	Operational RAID File Server: 128MB, 2GB,CDROM, 4mm DAT, Dual FDDI Card	DEC Alpha 1000 4/233	14,327	Vendor 217 Pred.
GSFC	EOC-RAID	B	1	Operational RAID 5 Unit: 60 GB	DEC Storage Works	500,000	Vendor 217 Pred.
GSFC	EOC-SRV	B	1	Multicast Server: 64MB,2GB, CD ROM, 2 Ethernet Cards, 21" monitor	SUN Sparc20 Model 71	8,612	Vendor 217 Pred.
GSFC	EOC-LSM SRV	B	2	Local System Mgr. Server: 128MB,2GB, CD ROM, 2 Ethernet Cards, 21" monitor	HP J210	16,560	Vendor 217 Pred
GSFC	EOC-SUP RAID	B	2	Support RAID File Server: 128MB, 2GB,CDROM, 4mm DAT, Dual FDDI Card	DEC Alpha 1000 4/233	14,327	Vendor 217 Pred.
GSFC	EOC-SUP RAID	B	1	Support RAID 5 Unit: 12GB	DEC Storage Works	500,000	Vendor 217 Pred.
GSFC	EOC	B	7	Laser Printer	HP Laser Jet 4M	8,000	Vendor 217 Pred.
GSFC	EOC	B	5	Color Printer	HP Laser Jet	6,000	Vendor 217 Pred.
GSFC	EOC	B	12	20-Inch Color Monitor GX	SUN Monitor	25,000	Vendor 217 Pred.
GSFC	EOC	B	12	FDDI CONCENTRATOR	FDDI Concentr.	100,000	Vendor 217 Pred.
GSFC	EOC	B	1	ETHERNET HUB	Ethernet Hub - Cabletron	100,000	Vendor 217 Pred.

## A.2 Science Data Processing Segment (SDPS) and Communications and System Management Segment (CSMS) Reliability Prediction Data

*SDPS and CSMS COTS Hardware RMA Data For Release B (1 of 19)*

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
LARC	ACM	B	2	APC SERVER	SGI Challenge L, 4 CPU, 256 MB RAM, 4 GB	6,714	Vendor 217 Pred.
LARC	ACM	B	1	RAID DISK	340 GB	150,000	Vendor 217 Pred.
LARC	ACM	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
LARC	ACM	B	8	LIBRARY DRIVES	D3 Tape Drives	2,325	Vendor 217 Pred.
LARC	ACM	B	2	OPS WORKSTATION	Sun Sparc 20/50, 64 MB RAM, 4 GB	15,947	Vendor 217 Pred.
LARC	AQA	B	1	QA WORKSTATION	SGI Indigo2 XZ, 256 MB RAM, 10 GB	4,684	Vendor 217 Pred.
LARC	AQA	B	1	RAID	17 GB RAID	150,000	Vendor 217 Pred.
LARC	AIT	B	1	AIT WORKSTATION	Sun Sparc 20/712, 256 MB RAM, 6 GB	3,752	Vendor 217 Pred.
LARC	AIT	B	2	AIT WORKSTATION	Sun Sparc 20/50, 64 MB RAM, 6 GB	15,947	Vendor 217 Pred.
LARC	AIT	B	1	AIT WORKSTATION	Sun Sparc 20/50, 64 MB RAM, 8 GB	15,947	Vendor 217 Pred.
LARC	AIT	B	2	PRINTER	HP LaserJet 4M+, 12ppm, 14 MB	8,000	Vendor 217 Pred.
LARC	AIT	B	7	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
LARC	DIP	B	3	DISTRIBUTION SERVER	SUN Sparc 20/712, 256 MB RAM, 6 GB	3,752	Vendor 217 Pred.
LARC	DIP	B	1	RAID DISK	240 GB	150,000	Vendor 217 Pred.
LARC	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
LARC	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
LARC	DIP	B	1	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
LARC	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
LARC	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (2 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
LARC	DIP	B	1	TAPE DRIVE	6250 BPI Tape Drive	16,717	Vendor 217 Pred.
LARC	DIP	B	2	PRINTER	HP LaserJet 4M+, 12 ppm, 14 MB	8,000	Vendor 217 Pred.
LARC	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
LARC	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
LARC	DMG	B	3	DATA SPECIALIST WORKSTATION	SUN Sparc 20/50, 64 MB RAM, 6 GB	15,947	Vendor 217 Pred.
LARC	DMG	B	1	DBA OPS WORKSTATION	HP 715/64, 64 MB RAM, 6 GB	37,300	Vendor 217 Pred.
LARC	DRP	B	2	FSMS SERVER	SGI Challenge XL, 4 CPU, 512 MB RAM, 6 GB	4,664	Vendor 217 Pred.
LARC	DRP	B	1	RAID DISK	85 GB	150,000	Vendor 217 Pred.
LARC	DRP	B	2	ARCHIVE ROBOTICS	EMASS AML, Model 2, Tall Quadro Tower, 2 Arms)	6,301	Vendor 217 Pred.
LARC	DRP	B	20	TAPE DRIVE	3590 Tape Drive (10 each per archive robotics)	10,000	Vendor 217 Pred.
LARC	DRP	B	2	DBMS SERVER	SGI Challenge XL, 2 CPU, 256 MB RAM, 6 GB	5,109	Vendor 217 Pred.
LARC	DRP	B	1	RAID DISK	10 GB	150,000	Vendor 217 Pred.
LARC	DDS	B	2	DOCUMENT SERVER	SUN Sparcstation 20/712, 256MB, 6GB	3,752	Vendor 217 Pred.
LARC	ICL	B	1	RAID	SGI 102 GB RAID	150,000	Vendor 217 Pred.
LARC	ICL	B	2	8MM TP STACKER W/3 DR	8mm Drive w/stacker - EXABYTE 210	160,000	Vendor 217 Pred.
LARC	ICL	B	2	INGEST SERVER	SGI Challenge L, 4 CPU, 256MB, 6GB,FDDI	6,714	Vendor 217 Pred.
LARC	ICL	B	1	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
LARC	ICL	B	1	ARCHIVE ROBOTICS	ARCHIVE ROBOTICS - 1 Tower, 1 Arm	7,012	Vendor 217 Pred.
LARC	ICL	B	2	LINEAR MAG DR	NTP Linear Tape Drive, 3590	10,000	Vendor 217 Pred.
LARC	ICL	B	1	INGEST SERVER	SGI Indigo2, 256 MB RAM, 6 GB	4,684	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (3 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
LARC	ICL	B	1	INGEST SERVER	SGI Challenge DM, 256 MB RAM, 4 GB	5,914	Vendor 217 Pred.
LARC	PLAN	B	2	PDPS DBMS SERVER	SUN Sparc 20/712, 512 MB RAM, 6 GB	3,752	Vendor 217 Pred.
LARC	PLAN	B	4	DISK	Sparcstorage Multipack 6.3 GB (2 each per server)	250,000	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 20 CPU, 2 GB RAM, 12 GB, HiPPI	2,748	Vendor 217 Pred.
LARC	SPR	B	2	RAID DISK	SGI 144 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
LARC	SPR	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
LARC	SPR	B	5	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 12 CPU, 2 GB RAM, 12 GB, HiPPI, 4mm	3,458	Vendor 217 Pred.
LARC	SPR	B	1	RAID	SGI 68 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 18 CPU, 2 GB RAM, 12 GB, HiPPI	2,896	Vendor 217 Pred.
LARC	SPR	B	1	RAID	SGI 102 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 20 CPU, 2 GB RAM, 18 GB, HiPPI	2,748	Vendor 217 Pred.
LARC	SPR	B	1	RAID	SGI 432 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 16 CPU, 2 GB RAM, 18 GB, HiPPI	3,062	Vendor 217 Pred.
LARC	SPR	B	1	RAID	SGI 144 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 16 CPU, 2 GB RAM, 18 GB, HiPPI	3,062	Vendor 217 Pred.
LARC	SPR	B	1	RAID	SGI 144 GB	150,000	Vendor 217 Pred.
LARC	SPR	B	2	QUEUEING SERVER	SUN Sparc 20/712, 512 MB RAM, 6 GB	3,752	Vendor 217 Pred.
LARC	SPR	B	4	DISK	Sparcstorage Multipack 6.3 GB (2 each per server)	250,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (4 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
LARC	WKS	B	2	WKS HOST	SGI Challenge L, 4 CPU, 256 MB RAM, 4 GB	6,714	Vendor 217 Pred.
LARC	WKS	B	1	RAID DISK	SGI 62 GB	150,000	Vendor 217 Pred.
LARC	WKS	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
LARC	WKS	B	6	LIBRARY DRIVES	D3 TAPE DRIVES	2,325	Vendor 217 Pred.
LARC	CSS	B	1	CSS SERVER	HP J210, 4 CPU, 256 MB, 4 GB	20,000	Vendor 217 Pred.
LARC	MSS	B	1	MSS SERVER	HP J210, 4 CPU, 256 MB, 4 GB	20,000	Vendor 217 Pred.
LARC	MSS	B	1	RAID	HP 36 GB RAID	150,000	Vendor 217 Pred.
LARC	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
LARC	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
LARC	MSS	B	1	MSS WS	SUN Sparcstation 20/50, 128 MB, 4GB	15,947	Vendor 217 Pred.
LARC	MSS	B	1	MSS WS	SUN Sparcstation 20/50, 128 MB, 10GB	15,947	Vendor 217 Pred.
LARC	MSS	B	1	MSS WS	SUN Sparc 20/712, 256 MB RAM, 6 GB	3,752	Vendor 217 Pred.
LARC	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
LARC	ISS	B	12	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
LARC	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC (4 FDDI cards & 3 power supplies)	146,000	Vendor 217 Pred.
LARC	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron MicroMAC-22E w/BRIM-F6	95,573	Vendor 217 Pred.
LARC	ISS	B	1	HPPI SWITCH	HPPI SWITCH	125,000	Vendor 217 Pred.
LARC	ISS	B	1	FIDDI ROUTER	FIDDI ROUTER	161,290	Vendor 217 Pred.
NSIDC	ACM	B	2	ACM HOST	SGI Challenge L, 4 CPU, 512 MB RAM, 6 GB	6,714	Vendor 217 Pred.
NSIDC	ACM	B	2	RAID DISK	108 GB	150,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (5 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
NSIDC	ACM	B	2	OPS WORKSTATION	SUN Ultra 140, 64 MB RAM, 4 GB	8,324	Vendor 217 Pred.
NSIDC	ACM	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
NSIDC	ACM	B	8	LIBRARY DRIVES	D3 Tape Drives	2,325	Vendor 217 Pred.
NSIDC	DIP	B	2	DISTRIBUTION SERVER	SUN Sparc 20/712, 256 MB RAM, 6 GB	3,752	Vendor 217 Pred.
NSIDC	DIP	B	1	RAID DISK	210 GB	150,000	Vendor 217 Pred.
NSIDC	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
NSIDC	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
NSIDC	DIP	B	1	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
NSIDC	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
NSIDC	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.
NSIDC	DIP	B	1	TAPE DRIVE	6250 BPI Tape Drive	16,717	Vendor 217 Pred.
NSIDC	DIP	B	2	PRINTER	HP LaserJet 4M+, 12 ppm, 14 MB	8,000	Vendor 217 Pred.
NSIDC	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
NSIDC	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
NSIDC	DMG	B	1	DBA OPS WORKSTATION	HP C100, 64 MB RAM, 6 GB	35,700	Vendor 217 Pred.
NSIDC	DMG	B	2	DATA SPECIALIST WORKSTATION	SUN Ultra 140, 64 MB RAM, 6 GB	8,324	Vendor 217 Pred.
NSIDC	DRP	B	2	FSMS SERVER	SGI Challenge L, 2 CPU, 256 MB RAM, 12 GB	6,714	Vendor 217 Pred.
NSIDC	DRP	B	1	ARCHIVE ROBOTICS	STK Powderhorn ATL	5,109	Vendor 217 Pred.
NSIDC	DRP	B	6	TAPE DRIVE	3590 Tape Drive	10,000	Vendor 217 Pred.
NSIDC	DRP	B	2	DBMS SERVER	SGI Challenge DM, 2 CPU, 256 MB RAM, 4 GB	5,914	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (6 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
NSIDC	DRP	B	1	DISK	17 GB	160,000	Vendor 217 Pred.
NSIDC	DDS	B	2	DOCUMENT SERVER	SUN Ultra 4-slot, 2 CPU, 256 MB RAM, 6 GB	8,300	Vendor 217 Pred.
NSIDC	DDS	B	1	DISK	6 GB	250,000	Vendor 217 Pred.
NSIDC	PLAN	B	1	PDPS DBMS SERVER	SUN Ultra 8-slot, 2 CPUs, 512 MB RAM, 6 GB	8,300	Vendor 217 Pred.
NSIDC	PLAN	B	2	DISK	Sparcstorage Multipack 8.4 GB (2 per server)	200,000	Vendor 217 Pred.
NSIDC	PLAN	B	2	PROD PLANNING/MGMT W/S	SUN Sparc 20/71, 512 MB RAM, 6 GB	11,337	Vendor 217 Pred.
NSIDC	SPR	B	1	AI&T PROCESSOR	SGI Power Challenge L, 4 CPU, 512 MB RAM, 4 GB	6,714	Vendor 217 Pred.
NSIDC	SPR	B	1	RAID DISK	SGI 17 GB	150,000	Vendor 217 Pred.
NSIDC	SPR	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
NSIDC	SPR	B	1	AI&T/AQA PROCESSOR	SGI Indigo2 Impact, 2 CPU, 128 MB RAM, 4 GB	4,684	Vendor 217 Pred.
NSIDC	SPR	B	1	RAID	SGI 17 GB	150,000	Vendor 217 Pred.
NSIDC	SPR	B	1	QUEUEING SERVER	SUN Ultra 8-slot, 2 CPUs, 512 MB RAM, 6 GB	8,300	Vendor 217 Pred.
NSIDC	SPR	B	2	DISK	Sparcstorage Multipack 8.4 GB (2 per server)	200,000	Vendor 217 Pred.
NSIDC	SPR	B	4	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
NSIDC	WKS	B	1	WKS HOST	SGI Challenge L, 6 CPUs, 512 MB RAM, 12 GB	5,740	Vendor 217 Pred.
NSIDC	WKS	B	1	ARCHIVE ROBOTICS	ABBA/E ATL	7,012	Vendor 217 Pred.
NSIDC	WKS	B	2	LIBRARY DRIVES	3590 DRIVES	10,000	Vendor 217 Pred.
NSIDC	CSS	B	1	CSS SERVER	HP J210/2, 384 MB RAM, 4 GB	20,000	Vendor 217 Pred.
NSIDC	MSS	B	1	MSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
NSIDC	MSS	B	1	RAID	HP 36 GB RAID	150,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (7 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
NSIDC	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
NSIDC	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
NSIDC	MSS	B	2	MSS WS	SUN Ultra 140, 128MB, 4GB	8,324	Vendor 217 Pred.
NSIDC	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
NSIDC	ISS	B	10	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
NSIDC	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC	146,520	Vendor 217 Pred.
NSIDC	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron	95,573	Vendor 217 Pred.
NSIDC	ISS	B	1	ETHERNET ROUTER	Ethernet Router	161,290	Vendor 217 Pred.
EDC	ACM	B	2	APC SERVER	SGI PC XL, 12 CPU, 1 GB RAM, 6 GB	3,458	Vendor 217 Pred.
EDC	ACM	B	2	RAID DISK	360 GB	150,000	Vendor 217 Pred.
EDC	ACM	B	1	TAPE LIBRARY	STK Powderhorn	5,109	Vendor 217 Pred.
EDC	ACM	B	12	LIBRARY DRIVES	3490 Tape Drives	35,000	Vendor 217 Pred.
EDC	ACM	B	2	Ops Workstation	Sun Ultra 140, 64 MB RAM, 4 GB	8,324	Vendor 217 Pred.
EDC	AQA	B	1	QA CLIENT	SGI Indigo2 Impact, 128 MB RAM, 4 GB	4,684	Vendor 217 Pred.
EDC	AQA	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
EDC	AIT	B	1	AIT/Sybase Server	Sun Sparc 20/50, 128 MB RAM, 6 GB	15,947	Vendor 217 Pred.
EDC	AIT	B	1	DISK	4 GB	400,000	Vendor 217 Pred.
EDC	AIT	B	2	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
EDC	AIT	B	2	PRINTER	HP LaserJet 4M+, 12ppm, 14 MB	8,000	Vendor 217 Pred.
EDC	DIP	B	2	DISTRIBUTION SERVER	SUN Ultra 4-slot, 2 CPU, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (8 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
EDC	DIP	B	2	RAID DISK	608 GB	150,000	Vendor 217 Pred.
EDC	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
EDC	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
EDC	DIP	B	3	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
EDC	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
EDC	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.
EDC	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
EDC	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
EDC	DMG	B	1	DBA OPS WORKSTATION	HP C100, 64 MB RAM, 6 GB	35,700	Vendor 217 Pred.
EDC	DMG	B	2	DATA SPECIALIST WORKSTATION	SUN Ultra 140, 64 MB RAM, 6 GB	8,324	Vendor 217 Pred.
EDC	DRP	B	2	FSMS SERVER	SGI PC XL, 6 CPU, 512 MB RAM, 6 GB	4,290	Vendor 217 Pred.
EDC	DRP	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
EDC	DRP	B	1	RAID DISK	34 GB	150,000	Vendor 217 Pred.
EDC	DRP	B	3	ARCHIVE ROBOTICS	STK Powderhorn	5,109	Vendor 217 Pred.
EDC	DRP	B	48	TAPE DRIVE	3590 Tape Drive (16 each per archive robotics)	2,325	Vendor 217 Pred.
EDC	DRP	B	2	DBMS SERVER	SGI PC XL, 2 CPU, 256 MB RAM, 4 GB	5,109	Vendor 217 Pred.
EDC	DRP	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
EDC	DDS	B	2	DOCUMENT SERVER	SUN Ultra 4-slot, 256MB, 8 GB	8,300	Vendor 217 Pred.
EDC	ICL	B	1	INGEST SERVER	SGI Indigo2, 2 CPU, 256MB RAM, 6GB	4,684	Vendor 217 Pred.
EDC	ICL	B	2	8MM TP STACKER W/3 DR	8mm Drive w/stacker - EXABYTE 210	160,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (9 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
EDC	ICL	B	2	INGEST SERV	SGI Indigo2, 2 CPU, 256MB RAM, 6GB	4,684	Vendor 217 Pred.
EDC	ICL	B	1	RAID	SGI RAID	150,000	Vendor 217 Pred.
EDC	PLAN	B	1	PDPS DBMS SERVER	SUN Ultra 8-slot, 4 CPUs, 512 MB RAM, 6 GB	7,185	Vendor 217 Pred.
EDC	PLAN	B	2	DISK	Sparcstorage Multipack 10.5 GB (2 per server)	160,000	Vendor 217 Pred.
EDC	PLAN	B	2	PROD PLANNING/MGMT W/S	SUN Sparc 20/71, 512 MB RAM, 6 GB	11,337	Vendor 217 Pred.
EDC	SPR	B	1	SCIENCE PROCESSOR	SGI PC XL, 10 CPU, 1 GB RAM, 4 GB, HiPPI, 4mm	3,697	Vendor 217 Pred.
EDC	SPR	B	2	RAID DISK	SGI 288 GB	150,000	Vendor 217 Pred.
EDC	SPR	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
EDC	SPR	B	6	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
EDC	SPR	B	2	SCIENCE PROCESSOR	SGI PC XL, 10 CPU, 1 GB RAM, 9 GB	3,697	Vendor 217 Pred.
EDC	SPR	B	2	RAID	SGI 288 GB	150,000	Vendor 217 Pred.
EDC	SPR	B	1	SCIENCE PROCESSOR	SGI PC XL, 6 CPU, 1 GB RAM, 8 GB	4,290	Vendor 217 Pred.
EDC	SPR	B	1	RAID	SGI 72 GB	150,000	Vendor 217 Pred.
EDC	SPR	B	1	QUEUEING SERVER	SUN Ultra 8-slot, 4 CPUs, 512 MB RAM, 4 GB	7,185	Vendor 217 Pred.
EDC	SPR	B	2	DISK	Sparcstorage Multipack 10.5 GB (2 per server)	160,000	Vendor 217 Pred.
EDC	WKS	B	3	WKSHW HOST	SGI PC XL, 6 CPU, 512 MB RAM, 6[ GB	4,290	Vendor 217 Pred.
EDC	WKS	B	3	RAID DISK	SGI 34 GB	150,000	Vendor 217 Pred.
EDC	WKS	B	1	WKSHW HOST	SGI PC XL, 8 CPU, 512 MB RAM, 6[ GB	3,971	Vendor 217 Pred.
EDC	WKS	B	1	RAID DISK	SGI 68 GB	150,000	Vendor 217 Pred.
EDC	WKS	B	1	TAPE LIBRARY	STK Powderhorn	5,109	Vendor 217 Pred.

***SDPS AND CSMS COTS Hardware RMA Data For Release B (10 of 19)***

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
EDC	WKS	B	32	LIBRARY DRIVES	D3 TAPE DRIVES	2,325	Vendor 217 Pred.
EDC	CSS	B	1	CSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
EDC	MSS	B	1	MSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
EDC	MSS	B	1	RAID	HP 48 GB RAID	150,000	Vendor 217 Pred.
EDC	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
EDC	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
EDC	MSS	B	1	MSS WS	SUN Sparcstation 20/50, 128 MB, 6 GB	15,947	Vendor 217 Pred.
EDC	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 4GB	8,324	Vendor 217 Pred.
EDC	MSS	B	1	MSS WS	SUN Sparc 20/712	3,752	Vendor 217 Pred.
EDC	MSS	B	2	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
EDC	ISS	B	10	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
EDC	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC (4 FDDI cards & 3 power supplies)	146,000	Vendor 217 Pred.
EDC	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron MicroMAC-22E w/BRIM-F6	95,573	Vendor 217 Pred.
EDC	ISS	B	1	HPPI SWITCH	HPPI SWITCH	125,000	Vendor 217 Pred.
EDC	ISS	B	1	FIDDI ROUTER	FIDDI ROUTER	161,290	Vendor 217 Pred.
GSFC	ACM	B	2	APC SERVER	SGI Challenge L, 4 CPU, 256 MB RAM, 4 GB	6,714	Vendor 217 Pred.
GSFC	ACM	B	1	RAID DISK	460 GB	150,000	Vendor 217 Pred.
GSFC	ACM	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
GSFC	ACM	B	8	LIBRARY DRIVES	D3 Tape Drives	2,325	Vendor 217 Pred.
GSFC	ACM	B	2	Ops Workstation	Sun Sparc 20/50, 64 MB RAM, 2 GB	15,947	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (11 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
GSFC	AQA	B	1	QA WORKSTATION	SGI Indigo2 XZ, 256 MB RAM, 10 GB	4,684	Vendor 217 Pred.
GSFC	AIT	B	1	AIT WORKSTATION	Sun Sparc 20/712	3,752	Vendor 217 Pred.
GSFC	AIT	B	3	AIT WORKSTATION	Sun Sparc 20/50	15,947	Vendor 217 Pred.
GSFC	AIT	B	2	PRINTER	HP LaserJet 4M+, 12ppm, 14 MB	8,000	Vendor 217 Pred.
GSFC	DIP	B	3	DISTRIBUTION SERVER	SUN Sparc 20/712, 256 MB RAM, 6 GB	3,752	Vendor 217 Pred.
GSFC	DIP	B	1	RAID DISK	240 GB	150,000	Vendor 217 Pred.
GSFC	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
GSFC	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
GSFC	DIP	B	1	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
GSFC	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
GSFC	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.
GSFC	DIP	B	1	TAPE DRIVE	6250 BPI Tape Drive	16,717	Vendor 217 Pred.
GSFC	DIP	B	2	PRINTER	HP LaserJet 4M+, 12 ppm, 14 MB	8,000	Vendor 217 Pred.
GSFC	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
GSFC	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
GSFC	DMG	B	3	DATA SPECIALIST WORKSTATION	SUN Sparc 20/50, 64 MB RAM, 4 GB	15,947	Vendor 217 Pred.
GSFC	DMG	B	1	DBA OPS WORKSTATION	HP 715/64, 64 MB RAM, 6 GB, 8mm	37,300	Vendor 217 Pred.
GSFC	DRP	B	2	FSMS SERVER	SGI Challenge XL, 4 CPU, 512 MB RAM, 6 GB	4,664	Vendor 217 Pred.
GSFC	DRP	B	1	RAID DISK	68 GB	150,000	Vendor 217 Pred.
GSFC	DRP	B	2	ARCHIVE ROBOTICS	EMASS AML, Model 2, Tall Quadro Tower, 2 Arms)	6,301	Vendor 217 Pred.

***SDPS AND CSMS COTS Hardware RMA Data For Release B (12 of 19)***

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
GSFC	DRP	B	20	TAPE DRIVE	3590 Tape Drive (10 each per archive robotics)	10,000	Vendor 217 Pred.
GSFC	DRP	B	2	DBMS SERVER	SGI Challenge XL, 2 CPU, 256 MB RAM, 6 GB	5,109	Vendor 217 Pred.
GSFC	DRP	B	1	RAID DISK	10 GB	150,000	Vendor 217 Pred.
GSFC	DDS	B	2	DOCUMENT SERVER	SUN Sparcstation 20/712, 256MB, 6GB	3,752	Vendor 217 Pred.
GSFC	ICL	B	1	RAID	SGI 100 GB RAID	150,000	Vendor 217 Pred.
GSFC	ICL	B	2	8MM TP STACKER W/3 DR	8mm Drive w/stacker - EXABYTE 210	160,000	Vendor 217 Pred.
GSFC	ICL	B	2	INGEST SERVER	SGI Challenge L, 4 CPU, 256MB, 6GB,FDDI	6,714	Vendor 217 Pred.
GSFC	ICL	B	1	X TERMINAL	X TERMINAL (NCD)	27,548	Vendor 217 Pred.
GSFC	ICL	B	1	ARCHIVE ROBOTICS	ARCHIVE ROBOTICS - 1 Tower, 1 Arm	7,012	Vendor 217 Pred.
GSFC	ICL	B	2	LINEAR MAG DR	NTP Linear Tape Drive, 3590	10,000	Vendor 217 Pred.
GSFC	PLAN	B	1	PDPS DBMS SERVER	SUN Ultra 8-slot, 4 CPUs, 512 MB RAM, 6 GB	7,185	Vendor 217 Pred.
GSFC	PLAN	B	2	DISK	Sparcstorage Multipack 10.5 GB (2 per server)	160,000	Vendor 217 Pred.
GSFC	PLAN	B	2	PROD PLANNING/MGMT W/S	SUN Sparc 20/71, 512 MB RAM, 6 GB	11,337	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 8 CPU, 2 GB RAM, 12 GB, HiPPI	3,971	Vendor 217 Pred.
GSFC	SPR	B	2	RAID DISK	SGI 212 GB	150,000	Vendor 217 Pred.
GSFC	SPR	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
GSFC	SPR	B	9	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 16 CPU, 2 GB RAM, 18 GB, HiPPI	3,062	Vendor 217 Pred.
GSFC	SPR	B	1	RAID	SGI 212 GB	150,000	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Power Challenge XL, 16 CPU, 2 GB RAM, 18 GB, HiPPI	3,062	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (13 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
GSFC	SPR	B	1	RAID	SGI 212 GB	150,000	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Challenge DM, 2 CPU, 256 MB RAM, 2 GB	5,914	Vendor 217 Pred.
GSFC	SPR	B	1	RAID	68 GB	150,000	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Indy, 256 MB RAM, 4 GB	5,288	Vendor 217 Pred.
GSFC	SPR	B	1	8MM TP STACKER W/3 DR	8mm Drive w/stacker - EXABYTE 210	160,000	Vendor 217 Pred.
GSFC	SPR	B	1	SCIENCE PROCESSOR	SGI Indy, 256 MB RAM, 6 GB	5,288	Vendor 217 Pred.
GSFC	SPR	B	1	QUEUEING SERVER	SUN Ultra 8-slot, 4 CPUs, 512 MB RAM, 6 GB	7,185	Vendor 217 Pred.
GSFC	SPR	B	2	DISK	Sparcstorage Multipack 10.5 GB (2 per server)	160,000	Vendor 217 Pred.
GSFC	WKS	B	2	WKSHW HOST	SGI Challenge L, 4 CPU, 256 MB RAM, 4 GB	6,714	Vendor 217 Pred.
GSFC	WKS	B	1	RAID DISK	SGI 340 GB	150,000	Vendor 217 Pred.
GSFC	WKS	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
GSFC	WKS	B	6	LIBRARY DRIVES	D3 TAPE DRIVES	2,325	Vendor 217 Pred.
GSFC	CSS	B	1	CSS SERVER	HP J210/1, 256 MB, 4 GB	20,000	Vendor 217 Pred.
GSFC	MSS	B	1	MSS SERVER	HP J210/1, 256 MB, 4 GB	20,000	Vendor 217 Pred.
GSFC	MSS	B	1	RAID	HP 108 GB RAID	150,000	Vendor 217 Pred.
GSFC	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
GSFC	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
GSFC	MSS	B	1	MSS WS	SUN Sparcstation 20/50, 128MB, 8GB	15,947	Vendor 217 Pred.
GSFC	MSS	B	1	MSS WS	SUN Sparcstation 20/50, 128MB, 4GB	15,947	Vendor 217 Pred.
GSFC	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (14 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
GSFC	ISS	B	12	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
GSFC	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC (4 FDDI cards & 3 power supplies)	146,000	Vendor 217 Pred.
GSFC	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron MicroMAC-22E w/BRIM-F6	95,573	Vendor 217 Pred.
GSFC	ISS	B	1	HPPI SWITCH	HPPI SWITCH	125,000	Vendor 217 Pred.
GSFC	ISS	B	1	FIDDI ROUTER	FIDDI ROUTER	161,290	Vendor 217 Pred.
ORNL	ACM	B	2	APC SERVER	SGI PC XL, 6 CPU, 512 MB RAM, 6 GB	4,290	Vendor 217 Pred.
ORNL	ACM	B	1	RAID DISK	161 GB	150,000	Vendor 217 Pred.
ORNL	ACM	B	2	OPS WORKSTATION	Sun Sparc 20/50, 64 MB RAM, 4 GB	15,947	Vendor 217 Pred.
ORNL	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
ORNL	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
ORNL	DMG	B	1	DBA OPS WORKSTATION	HP C100, 64 MB RAM, 6 GB	35,700	Vendor 217 Pred.
ORNL	DMG	B	2	DATA SPECIALIST WORKSTATION	SUN Ultra 140, 64 MB RAM, 6 GB	8,324	Vendor 217 Pred.
ORNL	DRP	B	2	DBMS SERVER	SGI PC XL, 2 CPU, 256 MB RAM, 4 GB	5,109	Vendor 217 Pred.
ORNL	DRP	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
ORNL	DDS	B	2	DOCUMENT SERVER	SUN Sparcstation 20/712, 256MB, 8 GB	3,752	Vendor 217 Pred.
ORNL	DDS	B	1	RAID DISK	10 GB	150,000	Vendor 217 Pred.
ORNL	CSS	B	1	CSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
ORNL	MSS	B	1	MSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
ORNL	MSS	B	1	RAID	HP 28 GB RAID	150,000	Vendor 217 Pred.
ORNL	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.

***SDPS AND CSMS COTS Hardware RMA Data For Release B (15 of 19)***

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
ORNL	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
ORNL	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 4 GB	8,324	Vendor 217 Pred.
ORNL	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 8 GB	8,324	Vendor 217 Pred.
ORNL	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
ORNL	ISS	B	1	ETHERNET SWITCH/ROUTER	Ethernet Switch/Router	161,290	Vendor 217 Pred.
ASF	ACM	B	2	APC SERVER	SGI Challenge XL, 6 CPU, 512 MB RAM, 6 GB	4,290	Vendor 217 Pred.
ASF	ACM	B	1	RAID DISK	288 GB	150,000	Vendor 217 Pred.
ASF	ACM	B	2	OPS WORKSTATION	SUN Ultra 140, 64 MB RAM, 4 GB	8,324	Vendor 217 Pred.
ASF	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
ASF	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
ASF	DMG	B	1	DBA OPS WORKSTATION	HP C100, 64 MB RAM, 6 GB	35,700	Vendor 217 Pred.
ASF	DMG	B	2	DATA SPECIALIST WORKSTATION	SUN Ultra 140, 64 MB RAM, 6 GB	8,324	Vendor 217 Pred.
ASF	DIP	B	2	DISTRIBUTION SERVER	SUN Ultra 4-slot, 2 CPU, 256 MB RAM, 6 GB	8,300	Vendor 217 Pred.
ASF	DIP	B	1	RAID DISK	74 GB	150,000	Vendor 217 Pred.
ASF	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
ASF	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
ASF	DIP	B	1	TAPE DRIVE	6250 BPI Tape Drive	16,717	Vendor 217 Pred.
ASF	DIP	B	1	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
ASF	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
ASF	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (16 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
ASF	DIP	B	2	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
ASF	DRP	B	1	FSMS SERVER	SGI Challenge XL, 6 CPU, 512 MB RAM, 8 GB	4,290	Vendor 217 Pred.
ASF	DRP	B	1	ARCHIVE ROBOTICS	EMASS ABBA/E	7,012	Vendor 217 Pred.
ASF	DRP	B	4	LIBRARY DRIVES	3590 Tape Drive	10,000	Vendor 217 Pred.
ASF	DRP	B	2	DBMS SERVER	SGI Challenge XL, 2 CPU, 256 MB RAM, 8 GB	5,109	Vendor 217 Pred.
ASF	DRP	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
ASF	DDS	B	2	DOCUMENT SERVER	SUN Ultra 4-slot, 2 CPU, 256 MB RAM, 6 GB	8,300	Vendor 217 Pred.
ASF	DDS	B	1	RAID DISK	6 GB	150,000	Vendor 217 Pred.
ASF	WKS	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
ASF	CSS	B	1	CSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
ASF	MSS	B	1	MSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
ASF	MSS	B	1	RAID	HP 28 GB RAID	150,000	Vendor 217 Pred.
ASF	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
ASF	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
ASF	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 4 GB	8,324	Vendor 217 Pred.
ASF	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 8 GB	8,324	Vendor 217 Pred.
ASF	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
ASF	ISS	B	7	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
ASF	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC (4 FDDI cards & 3 power supplies)	146,000	Vendor 217 Pred.
ASF	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron MicroMAC-22E w/BRIM-F6	95,573	Vendor 217 Pred.

***SDPS AND CSMS COTS Hardware RMA Data For Release B (17 fo 19)***

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
ASF	ISS	B	1	FIDDI ROUTER	FIDDI ROUTER	161,290	Vendor 217 Pred.
JPL	ACM	B	2	APC SERVER	SGI Challenge L, 8 CPU, 256 MB RAM, 4 GB	5,740	Vendor 217 Pred.
JPL	ACM	B	1	RAID DISK	68 GB	150,000	Vendor 217 Pred.
JPL	ACM	B	1	TAPE LIBRARY	STK Wolfcreek ATL	4,237	Vendor 217 Pred.
JPL	ACM	B	2	LIBRARY DRIVES	3490 Tape Drive	35,000	Vendor 217 Pred.
JPL	ACM	B	2	OPS WORKSTATION	SUN Ultra 140, 64 MB RAM, 4 GB	8,324	Vendor 217 Pred.
JPL	AITH W	B	4	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
JPL	AITH W	B	1	PRINTER	HP LaserJet 4M+, 12ppm, 14 MB	8,000	Vendor 217 Pred.
JPL	DIP	B	2	DISTRIBUTION SERVER	SUN Ultra 4-slot, 2 CPU, 256 MB RAM, 6 GB	8,300	Vendor 217 Pred.
JPL	DIP	B	1	RAID DISK	12 GB	150,000	Vendor 217 Pred.
JPL	DIP	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
JPL	DIP	B	1	TAPE STACKER	3, 4mm Drives w/stacker - Exabyte	146,000	Vendor 217 Pred.
JPL	DIP	B	1	TAPE DRIVE	6250 BPI Tape Drive	16,717	Vendor 217 Pred.
JPL	DIP	B	1	CD ROM	CD ROM, Recordable, JVC	14,598	Vendor 217 Pred.
JPL	DIP	B	1	FAX/SCANNER	FAX/SCANNER	5,000	Vendor 217 Pred.
JPL	DIP	B	1	TAPE DRIVE	3480/3490 TAPE DRIVE	35,000	Vendor 217 Pred.
JPL	DMG	B	1	DMG SERVER	K400, (redundant CPU & power supplies)	22,747	Vendor 217 Pred.
JPL	DMG	B	1	RAID DISK	HP 10 GB	150,000	Vendor 217 Pred.
JPL	DMG	B	1	DBA OPS WORKSTATION	HP C100, 64 MB RAM, 6 GB	35,700	Vendor 217 Pred.
JPL	DMG	B	2	DATA SPECIALIST WORKSTATION	SUN Ultra 140, 64 MB RAM, 6 GB	8,324	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (18 of 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
JPL	DRP	B	1	FSMS SERVER	SGI Challenge L, 4 CPU, 256 MB RAM, 10 GB	6,714	Vendor 217 Pred.
JPL	DRP	B	1	ARCHIVE ROBOTICS	ABBA/E ATL	7,012	Vendor 217 Pred.
JPL	DRP	B	4	LIBRARY DRIVES	D3 Tape Drive	2,325	Vendor 217 Pred.
JPL	DRP	B	2	DBMS SERVER	SGI Challenge XL, 2 CPU, 256 MB RAM, 10 GB	5,109	Vendor 217 Pred.
JPL	DRP	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
JPL	DDS	B	2	DOCUMENT SERVER	SUN Ultra 140, 2 CPU, 256 MB RAM, 6 GB	8,324	Vendor 217 Pred.
JPL	DDS	B	1	RAID DISK	6 GB	150,000	Vendor 217 Pred.
JPL	ICL	B	2	INGEST SERVER	SGI Challenge L, 4 CPU, 256MB, 6GB,FDDI	6,714	Vendor 217 Pred.
JPL	ICL	B	1	RAID	SGI 102 GB RAID	150,000	Vendor 217 Pred.
JPL	ICL	B	2	8MM TP STACKER W/3 DR	8mm Drive w/stacker - EXABYTE 210	160,000	Vendor 217 Pred.
JPL	ICL	B	1	ARCHIVE ROBOTICS	ARCHIVE ROBOTICS - 1 Tower, 1 Arm	7,012	Vendor 217 Pred.
JPL	ICL	B	2	LINEAR MAG DR	NTP Linear Tape Drive, 3590	10,000	Vendor 217 Pred.
JPL	ICL	B	1	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.
JPL	PLAN	B	2	PDPS DBMS SERVER	SUN Sparc 20/712, 512 MB RAM, 4 GB	3,752	Vendor 217 Pred.
JPL	PLAN	B	4	DISK	Sparcstorage Multipack 6.3 GB (2 each per server)	250,000	Vendor 217 Pred.
JPL	SPR	B	1	AIT & AQA PROCESSOR	SGI Indigo2 Impact, 128 MB RAM, 4 GB	4,684	Vendor 217 Pred.
JPL	SPR	B	1	RAID DISK	17 GB	150,000	Vendor 217 Pred.
JPL	SPR	B	2	SCIENCE PROCESSOR	SGI Challenge L, 4 CPU, 512MB, 4GB	6,714	Vendor 217 Pred.
JPL	SPR	B	1	TAPE STACKER	3, 8mm Drives w/stacker - Exabyte	160,000	Vendor 217 Pred.
JPL	SPR	B	2	X TERMINAL	X TERMINAL, NCD HMX Pro, 16 MB RAM	27,548	Vendor 217 Pred.

**SDPS AND CSMS COTS Hardware RMA Data For Release B (19 fo 19)**

Site	HWCI	Rel.	Qty	Item Description	Model	MTBF (Hours)	Data Source
JPL	SPR	B	2	QUEUEING SERVER	SUN Sparc 20/712, 512 MB RAM, 4 GB	3,752	Vendor 217 Pred.
JPL	SPR	B	4	DISK	Sparcstorage Multipack 6.3 GB (2 each per server)	250,000	Vendor 217 Pred.
JPL	WKS	B	1	WKS HOST	SGI Challenge L, 6 CPU, 512 MB RAM, 6 GB	5,740	Vendor 217 Pred.
JPL	WKS	B	1	RAID DISK	SGI 17 GB	150,000	Vendor 217 Pred.
JPL	CSS	B	1	CSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
JPL	MSS	B	1	MSS SERVER	HP J210/2, 384 MB, 4 GB	20,000	Vendor 217 Pred.
JPL	MSS	B	1	RAID	HP 28 GB RAID	150,000	Vendor 217 Pred.
JPL	MSS	B	1	MSS BACKUP SERVER	SUN Ultra 4-slot, 256 MB RAM, 4 GB	8,300	Vendor 217 Pred.
JPL	MSS	B	1	TAPE STACKER	DLT Stacker	146,000	Vendor 217 Pred.
JPL	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 4 GB	8,324	Vendor 217 Pred.
JPL	MSS	B	1	MSS WS	SUN Ultra 140, 128 MB RAM, 8 GB	8,324	Vendor 217 Pred.
JPL	MSS	B	1	LASER PRINTER	HP LaserJet 4M +, 12ppm, 14MB RAM	8,000	Vendor 217 Pred.
JPL	ISS	B	11	FDDI CONCENTRATOR	FDDI Concentrator - Bay Networks 2914-04	100,000	Vendor 217 Pred.
JPL	ISS	B	1	FDDI SWITCH	PowerHub7000 - ALANTEC (4 FDDI cards & 3 power supplies)	146,000	Vendor 217 Pred.
JPL	ISS	B	1	ETHERNET HUB	Ethernet Hub - Cabletron MicroMAC-22E w/BRIM-F6	95,573	Vendor 217 Pred.
JPL	ISS	B	1	ETHERNET SWITCH/ROUTER	Ethernet Switch/Router	161,290	Vendor 217 Pred.

## Abbreviations and Acronyms

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ACMHW	Access and Control Management Hardware CI
AITHW	Algorithm Integration and Test Hardware CI
AQAHW	Algorithm Quality Assurance Hardware CI
ATL	Automated Tape Library
ASF	Alaska SAR Facility
CCR	Configuration Change Request
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CI	Configuration Item
CN	Change Notice
COTS	Commercial Off The Shelf
CSS	Communication Subsystem
CSMS	Communications and Systems Management Segment (ECS)
DAAC	Distributed Active Archive Center
DCN	Document Change Notice
DID	Data Item Description
DIPHW	Distribution and Ingest Peripheral Hardware CI (DIP)
DMGHW	Data Management Server Hardware CI (DMG)
DRPHW	Data Repository Hardware CI (DRP)
ECS	EODIS Core System
EDC	EROS Data Center (DAAC)
EDS	Electronic Data Systems
EOC	EOS Operations Center (ECS)
EOC-SRV	EOS Operations Center (ECS) Server
EOC-WS	EOS Operations Center (ECS) Workstation
EOC-T-SRV	EOS Operations Center (ECS) Timing Server
EOC-RAID	Earth Observing System RAID
EOSDIS	Earth Observing System Data and Information System

EPL	Engineering Parts List
EROS	Earth Resources Observation System
ESDIS	Earth Science Data and Information System (GSFC)
FPMH	Failure Per Million Hours
FOS	Flight Operations Segment (ECS)
GFE	Government Furnished Equipment
GSFC	Goddard Space Flight Center
ICLHW	Ingest Client Hardware CI
IDR	Incremental Design Review
ILS	Integrated Logistics Support
ISS	Internetworking Subsystem
JPL	Jet Propulsion Laboratory
LaRC	Langley Research Center (DAAC)
LRU	Line Replaceable Unit
MTBF	Mean Time Between Failure
MSS	Management Subsystem
NASA	National Aeronautics and Space Administration
NPRD	Nonelectronic Parts Reliability Data
NSIDC	National Snow and Ice Data Center
ORNL	Oak Ridge National Laboratory
PAIP	Performance Assurance Implementation Plan
PDR	Preliminary Design Review
PLNHW	Planning Hardware CI (PLAN)
RAID	Redundant Array of Independent Disks
RMA	Reliability, Maintainability, Availability
SDPS	Science Data Processing Segment (ECS)
SMC	System Management Center (ECS)
SPRHW	Science Processing Hardware CI (SPR)
VCATS	Vendor 217 Pred. Costing And Tracking System (ECS)
WKSHW	Working Storage Hardware CI (WKS)